Volunteer Lake Assessment Program Individual Lake Reports

FOREST LAKE, WINCHESTER, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	4,480	**Max. Depth (m):**	9.8	**Flushing Rate (yr^{1})**	5
Surface Area (Ac.):	87	**Mean Depth (m):**	4.8	**P Retention Coef:**	0.46
Shore Length (m):	3,500	**Volume (m^{3}):**	1,645,000	**Elevation (ft):**	443

TROPHIC CLASSIFICATION

Year	Trophic class
2005	EUTROPHIC
2009	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

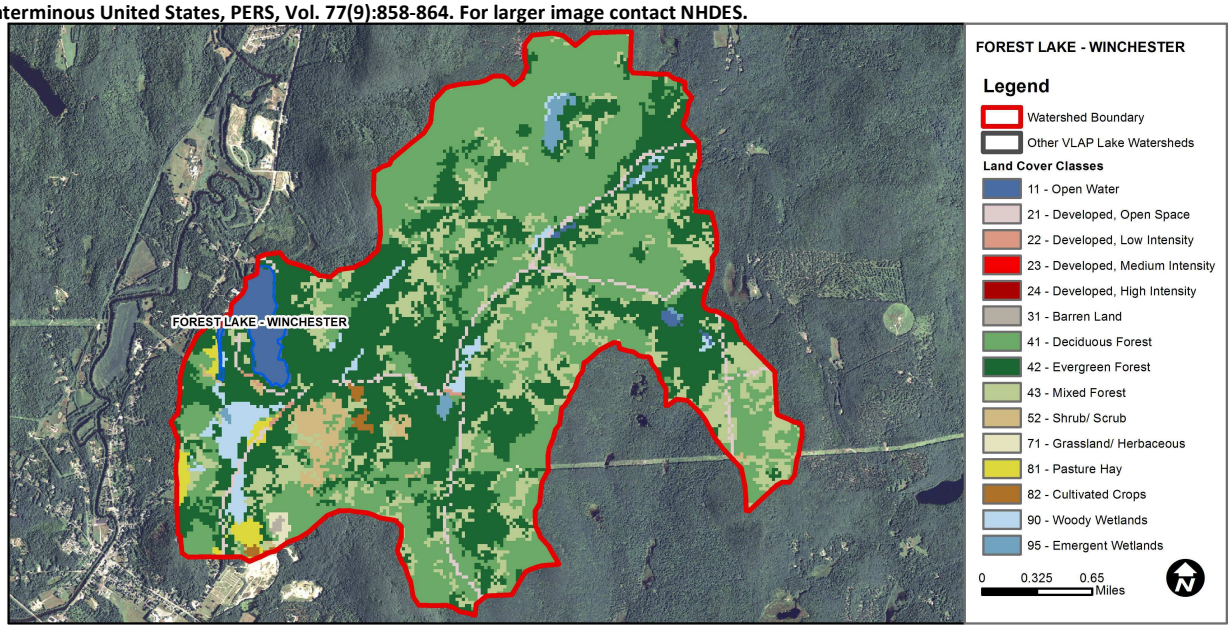
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	>/=5 samples and median is >threshold.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Very Good	At least 10 samples with 0 exceedances of criteria.
	D.O. (% sat)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	>5 samples and median is > threshold.
Primary Contact Recreation	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).

BEACH PRIMARY CONTACT ASSESSMENT STATUS

FOREST LAKE - TOWN BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
FOREST LAKE - TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	2.22	Barren Land	0.08	Grassland/Herbaceous	0.23
Developed-Open Space	2.21	Deciduous Forest	37.28	Pasture Hay	1
Developed-Low Intensity	0.14	Evergreen Forest	35.08	Cultivated Crops	0.34
Developed-Medium Intensity	0	Mixed Forest	16.47	Woody Wetlands	2.28
Developed-High Intensity	0	Shrub-Scrub	1.74	Emergent Wetlands	0.76

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
FOREST LAKE, WINCHESTER, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels increased greatly from July to August and the 2013 average was greater than the state median; however average levels were consistent with 2012. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride continue to be slightly elevated in Dump Branch and Campground Inlet, however have decreased since monitoring began. Hypolimnetic conductivity was slightly elevated in August likely due to organic compounds released from bottom sediments. Epilimnetic, NE Branch, Outlet and Sandy Point Inlet conductivity and chloride were relatively low. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity since monitoring began. We hope to see this continue!
- **E. COLI:** Campground Inlet E. coli levels were low and much less than the state standard for surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were relatively low and equal to the state median. Hypolimnetic phosphorus was elevated likely due to phosphorus released from bottom sediments under anoxic conditions. Campground Inlet and Dump Branch phosphorus were elevated in July and the turbidity was also elevated potentially due to low flow conditions. NE Branch phosphorus levels were slightly elevated in July and August but not above average for this station. Historical trend analysis indicates relatively stable epilimnetic phosphorus with high variability between years.
- **TRANSPARENCY:** Average transparency was better than the state median and historical trend analysis indicates significantly increasing (improving) transparency since monitoring began.
- **TURBIDITY:** Hypolimnetic turbidity was elevated likely due to the accumulation of organic compounds released from bottom sediments under anoxic conditions. Campground Inlet and Dump Branch turbidity were elevated in July potentially due to low flow conditions. NE Branch turbidity was slightly elevated in July however improved in August when tributary flows increased from a recent storm event.
- **PH:** pH levels were less than desirable range 6.5 – 8.0 units in the Campground Inlet, Metalimnion, Hypolimnion, Dump Branch, and Sandy Point Inlet. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began.
- **RECOMMENDED ACTIONS:** The improving conductivity and transparency trends are encouraging! Educate lake and watershed residents on ways to reduce stormwater runoff on their properties utilizing DES' "Homeowner's Guide to Stormwater Management" tool aimed at capturing and infiltrating stormwater runoff before it enters the lake and tributaries. Work with Campground owners and patrons to better control the spread of milfoil in Campground Inlet. Keep up the great work!

Table 1. 2013 Average Water Quality Data for FOREST LAKE

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m NVS	Turb. ntu	pH
Campground Inlet			7	80.8	10	53		5.82	6.18
Campground Inlet A					60				
Campground Inlet B					40				
Dump Branch			15	119.1		32		9.93	6.29
Epilimnion	7.15	6.73	6	48.2		12	3.79	1.24	6.74
Metalimnion				55.0		9		1.00	6.16
Hypolimnion				70.9		32		8.51	6.25
Ne Branch			4	51.1		29		2.31	6.75
Outlet				44.3		11		1.09	6.68
Sandy Point Inlet				24.0		12		1.09	6.43

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
Conductivity	Improving	Data significantly decreasing.	Transparency	Improving	Data significantly increasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.